

1 RECORD OF ORAL HEARING

2 UNITED STATES PATENT AND TRADEMARK OFFICE

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6 BEFORE THE PATENT TRIAL AND APPEAL BOARD

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9 *Ex parte* JOSEPH A. FERNANDO, JOHN D. TEN EYCK, and  
10 THOMAS S. LACKI

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13 Appeal 2012-001554  
14 Application 09/560,469  
15 Group Art Unit 1700  
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18 Oral Hearing Held: November 8, 2012  
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21 Before RICHARD E. SCHAFER, PETER F. KRATZ, and  
22 BEVERLY A. FRANKLIN, *Administrative Patent Judges*.

23  
24 APPEARANCES:

25  
26 ON BEHALF OF THE APPELLANT:

27  
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35 The above-entitled matter came on for hearing on Thursday,  
36 November 8, 2012, commencing at 2:26 p.m., at the U.S. Patent and  
37 Trademark Office, 600 Dulany Street, Alexandria, Virginia, before Judy  
38 Harrell Wallenfelt, Notary Public.  
39

PROCEEDINGS

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USHER: Calendar No. 65, 2010-001554,

Mr. Sidoti.

JUDGE SCHAFER: Okay. Before we go on the record --

**(Discussion off the record.)**

JUDGE SCHAFER: Okay. Let's go on the record. This is

Appeal No --

MR. SIDOTI: 2012.

JUDGE SCHAFER: -- 2012-001554, and it's in regard to Serial

No. 09/560,469.

Mr. Sidoti, we're familiar with your materials, so if you'll go ahead and give us your argument.

MR. SIDOTI: Thank you. Good afternoon, your Honors. Sal Sidoti, and I am attorney with Curatolo Sidoti in lovely Cleveland, Ohio; and I'm here today representing the application of the Unifrax Corporation. I'd like to thank the Board for giving me the opportunity this afternoon to appear and give my arguments in this case.

This application is directed to mounting mats for exhaust gas treatment devices, and exhaust gas treatment devices that include this mounting mat.

By way of background, there are two different -- there are two

1 major types of exhaust gas treatment devices; catalytic converters and  
2 diesel particulate traps.

3 They're both very similar devices. Both have an outer metallic  
4 housing. Both have a fragile ceramic monolith that resides within this  
5 housing. And wrapped around that ceramic monolith is a layer of fibrous  
6 material which we refer to as a mounting mat.

7 The difference between the two devices is a catalytic converter  
8 on that fragile monolith, there is catalyst that's deposited on there that  
9 catalyzes reactions from the gases coming out of the engine of the  
10 vehicle.

11 The diesel particulate trap has a filter in there that filters out the  
12 particulate byproduct from the combustion of the diesel fuel in diesel  
13 vehicles.

14 But both have this mounting mat, and it's wrapped around the  
15 circumference of the ceramic monolith, and then that monolith is forced  
16 into the housing.

17 And that layer of mounting mat resides in that gap between the  
18 inner surface of the metallic housing and the outer surface of the ceramic  
19 monolith.

20 So during the normal operation of a  
21 vehicle -- and I'll just refer to an internal combustion engine that utilizes  
22 a catalytic converter -- the gases flow from the internal combustion

1 engine out into the catalytic converter, and the gases go through this  
2 honeycomb monolith and are catalyzed into -- carbon monoxide that's in  
3 that gas is converted to carbon dioxide and water that's then -- it goes out  
4 your tail pipe into the environment.

5 The mounting mats have basically three functions. They serve  
6 to hold that ceramic monolith in place during normal operation of the  
7 catalytic converter. It provides thermal insulation to the outer metallic  
8 housing.

9 And it provides a gas-tight seal so that gases don't sort of go  
10 past the monolith in the gap; they go right through the monolith, and  
11 therefore they're catalyzed.

12 This mounting mat has to have the sufficient holding force or  
13 holding pressure to hold the monolith in place during normal operation of  
14 the catalytic converter. But the pressure cannot be so great, because this  
15 is ceramic and it is somewhat fragile. So you don't want the pressure to  
16 be so great that it will crush the monolith.

17 Turning to the specific claims in the application, we have three  
18 independent claims, 112 and 47.

19 Claim 1 is directed to a mounting mat that has a plurality of  
20 melt-formed ceramic fibers. These ceramic fibers are prepared from 40  
21 to 60 weight percent alumina, 40 to 60 weight percent silica. And as  
22 these are prepared from these molten materials, they're initially

1 amorphous fibers, meaning they don't have any crystalline structure that's  
2 detectable.

3 These fibers are subsequently heat-treated under one of two  
4 different time-temperature regimens to develop a certain crystallinity in  
5 the fiber.

6 And what we've claimed is a percent crystallinity of 5 to 50  
7 percent; and that of that crystallinity, the crystallite size is about 200 to  
8 500 angstroms, as measured by X-ray defraction.

9 Claim 12, which is directed to another embodiment of the  
10 mounting mat, basically is very similar to Claim 1 except there's a  
11 different time-temperature heat treatment regimen claimed.

12 Instead of 990 to 1050 for greater than one hour which is in  
13 Claim 1, this time-temperature regimen in Claim 12 is greater than 1050  
14 Celsius for an effective amount of time of develop the crystallinity and  
15 the crystallite size.

16 Claim 47 is similar to Claim 1, except we don't -- we don't  
17 recite in there the time-temperature heat treatment. We just recite what  
18 the percent crystallinity and the crystallite size is.

19 There was a final rejection on May 19, 2010. The primary  
20 rejection was Robinson plus Miles. It was a 103.

21 And then there was another rejection, Robinson plus Miles plus  
22 Sasaki; and that was directed to some independent -- or excuse me,

1 dependent claims directed to shot content of the fibers and needle mats.

2 We filed our main brief in April of 2011, and we addressed the  
3 rejections in the examiner's final rejection. In view of those arguments,  
4 the examiner withdrew her previous arguments and issued new final  
5 rejections.

6 And the new final rejections are on page 4 of the examiner's  
7 answer; and it's Claims 1, 2, 5, 6, 8 through 13, 16, 17, 19 through 27, 47  
8 through 50, and 52 through 57 are rejected under 103 in view of  
9 Robinson/Miles from the old rejection, plus Langer.

10 And then the dependent claim is directed to the shot content and  
11 the needling of the mat are rejected in view of Robinson, Miles, Langer,  
12 and Sasaki.

13 We elected to continue on with the appeal rather than to reopen  
14 prosecution, and we filed a reply brief; and I'm here before you today  
15 arguing the case.

16 I think my argument with respect to the first rejection, the  
17 combination of Robinson, Miles, and Langer, is very straightforward and  
18 very simple.

19 I think that the examiner is using the Langer reference to show  
20 that melt-formed fibers are used in mounting mats for catalytic  
21 converters, and then pulling in Miles to show melt-formed ceramic fibers  
22 with crystallinity greater than Langer.

1           But my argument here is that Langer specifically teaches away  
2       from using the types of fibers in Miles.

3           So to start with Robinson, which is the primary reference, I  
4       think we all agree that Robinson definitely shows a catalytic converter  
5       having an outer housing, a monolith, and a layer of mounting mat  
6       between the monolith and the housing.

7           But Robinson is specifically limited to the use of sol-gel fibers,  
8       which are fibers from a solvent solution of ceramic oxide precursors.

9           And in column 5 of Robinson, beginning at line 50, Robinson  
10      discloses, "Ceramic fibers which are useful in the mounting mat of the  
11      present invention include polycrystalline oxide ceramic fibers such as  
12      molite, aluminum, PI-alumina, aluminum silicates, zirconia, titania,  
13      chromium oxide and the like."

14          With respect to that first sentence, the examiner makes an  
15      allegation in her examiner's answer that this is just illustrative of the type  
16      of fibers that could be used, and there's really a broader -- alleged broader  
17      disclosure of all types of inorganic fibers that can be used.

18          But I think it's really clear that first part of the sentence, the  
19      fibers which are useful in the mounting mat of the present invention  
20      include these. It doesn't say these, for example. It's all polycrystalline  
21      oxide ceramic fibers, and this list is all those type of fibers that are made  
22      by sol-gel or solution spinning process.

1           Later on in that paragraph, two patents are cited for the  
2           proposition that the sol-gel fibers could be used. And the first one, this  
3           205 patent to Miyahara, which is also owned by my client.

4           By the way, Robinson is owned by my client. On the face of  
5           the patent, it says Unifrax. On the face of the Miyahara patent, it says  
6           Carborundum Company.

7           My client, Unifrax, is the successor in interest to the fibers  
8           business of the Carborundum Company, so we're familiar with this patent  
9           as well. And it's clear that that is a solution spinning process in  
10          Miyahara.

11          And in column 3, starting at line 1, they talk about "fibers  
12          produced in accordance with the invention have excellent refractoriness,  
13          flexibility, and believed to comprise a fiber which is either noncrystalline  
14          or contains small interconnecting or intertwined crystallites." So this is  
15          sol-gel with very small or fine grain crystals.

16          Turning to the second patent cited in Robinson, the 269 patent,  
17          on the face of this it's assigned to Kennecott Corporation. Carborundum  
18          was a successor to Kennecott, and we're a successor to Carborundum's  
19          fiber business. So we own this one as well and are familiar with it.

20          Again, this is trying to use a high-viscosity solution to make  
21          sol-gel fibers. And there's a disclosure that's very similar to the 205  
22          patent.



1           In column 2, under the heading "Detailed Description of the  
2     Invention," starting at line 65, it recites, "The ceramic fibers  
3     manufactured in accordance with the process of the invention are usually  
4     alumina, chromium, zirconium, titanium oxide fibers, have a  
5     polycrystalline or noncrystalline nature; i.e., are composed of  
6     microcrystals or are amorphous."

7           And if you flip over to column 5, lines 38 through 43, again  
8     there's this same disclosure about the fibers being noncrystalline, or small  
9     intertwined or interconnected crystals.

10          So Robinson's teachings are sol-gel fibers, very small crystals,  
11     not melt-formed, not larger crystals.

12          Turning to Langer, Langer definitely discloses a catalytic  
13     converter with a monolith, with a housing, with a mounting mat disposed  
14     between the housing and the monolith. Langer does disclose  
15     melt-formed fibers.

16          However, these melt-formed fibers that Langer discloses are  
17     rather fine grain or substantially amorphous. And Langer goes to great  
18     lengths to describe what they mean by fine grain or substantially  
19     amorphous, both in the patent itself and in their prosecution history.

20          If you look in Langer, column 2, starting about line 51, it talks  
21     about the "melt-formed refractory ceramic fibers of the heat insulating  
22     mat can be annealed to develop a fine grain crystalline form as in the

1 Johnson U.K. patent spec while avoiding higher temperatures that would  
2 result in coarse grained structures and consequently unsatisfactory  
3 resiliency value."

4 So what Langer says here is, Hold on, you can make fine grain,  
5 but don't go coarse grain; because if you go coarse grain, it's not going to  
6 work because it won't have the resiliency value, and it won't be able to  
7 hold the monolith in place.

8 It also talks about substantially amorphous, and they define  
9 that. Substantially amorphous is meant that no crystallinity can be  
10 detected by X-ray defraction, even though microcrystallinity has been  
11 detected in some cases by transmission electron microscopy.

12 If you look at the Johnson U.K. patent which Langer cites to,  
13 they specifically recognize that you can take amorphous aluminum  
14 silicate fibers and you can heat-treat them to form a crystalline material.

15 On page 1 of their patent specification, in column 2, lines 78  
16 through 82, the heat treatment being terminated subsequent to the  
17 formation of fine grain product but prior to the onset of excessive grain  
18 growth -- and on lines 90, 92, they talk about stopping the heat treatment  
19 prior to the onset of excessive grain growth.

20 If you turn to page 2, column 2, about line 93, "Care must be  
21 exercised to limit the heat treatment, especially at temperatures above  
22 1050 C in order to prevent excessive grain growth for the use of

1 excessive temperature above the devitrification temperature, or the use of  
2 sufficient devitrification over an excessive period of time will produce  
3 coarse grain structures with poor handling properties."

4 So when you read Langer in connection with the U.K. Johnson  
5 spec, it's talking about melt-formed fibers but that have fine grain  
6 crystals, not coarse grain crystals; and if you make coarse grain crystals,  
7 it's not going to work as a catalytic converter mounting mat.

8 Turning to the final reference, Miles; Miles discloses  
9 melt-formed aluminum silicate fibers. These fibers are prepared from 40  
10 to 65 weight percent alumina, 35 to 60 weight percent silica. These are  
11 heat treated to form microcrystals, and it's terminated before you form  
12 macrocrystals.

13 So with respect to Miles and Langer, I do not think that they're  
14 properly combinable; because Langer specifically is limited to fine grain  
15 and substantially amorphous, whereas Miles develops a crystallinity  
16 that's different and greater than that.

17 And so I think Langer completely teaches away; and since it  
18 teaches away, I do not believe it's combinable with Miles, and therefore  
19 the rejection can't stand. We can't substitute the fibers for Miles for  
20 Langer in the mat of Robinson.

21 JUDGE FRANKLIN: I think the examiner was using Langer  
22 just for the proposition that it's known in the art to use melt-formed

1 ceramic fibers to form support elements in catalytic converters. So I  
2 think that's what the examiner was using Langer for.

3 So let's talk more about Miles and whether there would be a  
4 reasonable likelihood of success of using that type of arrangement in  
5 Miles and Robinson. It appeared --

6 JUDGE SCHAFER: Because even -- I'm sorry. I interrupted  
7 you, Judge Franklin. Could you go ahead and --

8 JUDGE FRANKLIN: That's okay. So if we can just focus on  
9 that aspect of the rejection.

10 MR. SIDOTI: Okay. Do you want to fire away at me, or do  
11 you want me just to tell you what I think?

12 JUDGE FRANKLIN: Tell me what you think.

13 MR. SIDOTI: Okay. Well, Miles is definitely melt-formed  
14 refractory ceramic fiber made from alumina and silica. It's definitely heat  
15 treated.

16 JUDGE FRANKLIN: And if I'm correct, I believe the record  
17 doesn't dispute that Miles is using the same process and achieves the  
18 same type of fiber?

19 MR. SIDOTI: I believe -- I believe Miles discloses similar  
20 time-temperature regimens to develop crystallinity in their fibers. The  
21 one thing that Miles does not teach whatsoever is that you can take these  
22 fibers and incorporate them into a mounting mat, and then that mounting

1 mat would have certain holding pressure or holding force properties  
2 when used in a catalytic converter.

3 Miles specifically talks about furnace insulation, and I'm  
4 referring to the type of insulation that you sort of hang blankets of  
5 insulation around a furnace, or you position a blanket of this material  
6 adjacent a wall of a furnace.

7 However, in that particular application, there's really no need to  
8 worry about holding forces. So you don't have to worry about sort of the  
9 bulk densities that are required when you create this mat and you load it  
10 into this canister between the outer housing and the monolith.

11 So there's no -- nothing in Miles that addresses or even  
12 contemplates catalytic converters, mounting mats for catalytic converters,  
13 or the need for having a holding force or a certain holding pressure in a  
14 catalytic converter application.

15 And so that's why I think with respect to that -- I mean, I wasn't  
16 prepared to talk about that rejection. But I sort of think that's sort of a  
17 hindsight reconstruction.

18 We have a patent, a primary reference that has three elements;  
19 the housing, the monolith, the mat. But we're missing -- we're missing  
20 the heat-treated fibers that developed a certain crystallinity.

21 So then we're going to go out and look for that particular --  
22 fibers with that crystallinity, and then automatically say that they can be

1 incorporated into that mounting mat.

2 So I think that it's a hindsight reconstruction argument. I just  
3 don't think that there's anything in Miles that would point anyone having  
4 ordinary skill in the art to take those fibers and put them in a mounting  
5 mat.

6 JUDGE SCHAFER: But you don't contest that Miles teaches  
7 the same type of fibers that you're claiming?

8 MR. SIDOTI: I don't contend -- no.

9 JUDGE SCHAFER: You don't contest that. It's really whether  
10 you would take those fibers and put them into the catalytic converter --

11 MR. SIDOTI: That's correct, your Honor.

12 JUDGE SCHAFER: -- required by your claim.

13 JUDGE KRATZ: And this is the rejection -- absent Langer,  
14 this is the rejection dropped by the examiner, if I'm not mistaken.

15 MR. SIDOTI: It was.

16 JUDGE KRATZ: That's the rejection that, when you -- if you  
17 don't have Langer present, the examiner -- not that that's -- but he kind of  
18 walked away from that when he says, "I need to get this other reference  
19 in here, because I've got to have a way of getting this material into the  
20 first reference, Robinson."

21 MR. SIDOTI: Right. The final rejection in May of 2010 was  
22 Robinson and Miles. Our arguments in the appeal brief apparently

1       overcame that. That was withdrawn. And then the examiner added  
2       Langer as a third reference in his combination.

3               JUDGE KRATZ: And that pretty much is being used as the  
4       cement as to why you would make a modification of Robinson, because  
5       Langer is supposedly the one that would suggest you could go  
6       crystallinity versus amorphous. But the problem you're saying is,  
7       because it very specifically says, don't go beyond this microcrystallinity  
8       which would not be what you have.

9               MR. SIDOTI: Yeah. Yeah. That's correct. I believe Langer is  
10      explicit. They say fine grain or substantially amorphous.

11              The interesting corollary about Langer, I looked at the  
12      prosecution history a couple times. And I know we're talking about this  
13      overall disclosure, but their claims are limited to substantially  
14      amorphous.

15              And so they went -- they went and argued a lot with the  
16      examiner about what substantially amorphous is and what fine grain  
17      crystalline is. And it's definitely -- what they mean by fine grain  
18      crystalline is what's in that Johnson patent. And that Johnson patent is  
19      fine grain, not the coarse grain that we're talking about in our  
20      arrangement claims.

21              JUDGE KRATZ: But now having said that, though, is Langer  
22      really limited to that? Because the sections you're referring to in Langer

1       aren't a detailed description of the invention.

2               And I don't -- is Langer throughout always saying that's the  
3       only kind of crystallinity we can use, or he's just talking about --

4               You're saying that throughout the patent, if you read for its  
5       entirety, he is going to always be telling you don't go beyond -- that  
6       section at column 2, I think it was -- he's going to tell you, Hey, if you go  
7       beyond this, you're not going to get this requirement that you have to  
8       have for the holding power or the pressure.

9               MR. SIDOTI: Mm-hmm. Okay. So let me think on my feet  
10      here.

11              JUDGE KRATZ: I guess what I'm --

12              MR. SIDOTI: The answer to the question is, he is -- to me, I  
13      believe he is explicit. He's saying, I'm using fine grain or I'm using  
14      substantially amorphous.

15              And I think he starts with the proposition that these fibers are  
16      amorphous, they're not working, we're doing something to them to  
17      increase this resiliency value; and when you have an increased resiliency  
18      value, we're having a better holding force.

19              But there are some considerations. I think he is not saying go  
20      past fine grain crystalline.

21              And in fact, he makes an argument about don't even go to fine  
22      grain crystalline. Stay at substantially amorphous, because you have the



1 same performance and you're not going to waste money on the energy.

2 He says somewhere in here -- let me see -- he says, "Restricting  
3 the annealing temperature subject to melt-formed fibers remain  
4 substantially amorphous, there's a significant energy savings compared to  
5 Johnson's need to develop a crystalline structure."

6 So Johnson develops a fine grain crystalline structure. He's  
7 saying we can go with that embodiment; or even better, let's stay with  
8 substantially amorphous because you're going to have an energy savings.

9 And I think he says something else about that energy savings.  
10 Column 3, line 3, the effectiveness a heat insulating mat of melt-formed  
11 refractory ceramic fibers that are substantially amorphous is surprising in  
12 view of the need of Johnson U.K. to convert the fibers to a fine grain  
13 crystalline form.

14 JUDGE KRATZ: And he's also saying in that paragraph 2, is  
15 what you pointed to earlier, I think. But at least from your perspective,  
16 he's suggesting that no matter what, you don't want to go to that coarse  
17 grain, because you're not going to get that resiliency value.

18 And you're suggesting that prior to your invention, the teaching  
19 in the art -- at least represented by these three references -- would be that  
20 the kind of material that's in Miles would have been taught by Langer,  
21 don't go there. Is that what you're saying.

22 MR. SIDOTI: I'm saying Miles wouldn't -- I'm saying there's

1 no teaching in Miles to incorporate that material in a mounting mat.

2 JUDGE KRATZ: I guess my question, then, to be more  
3 specific, is Miles the kind of coarse grain that Langer is talking about you  
4 don't want to go to?

5 MR. SIDOTI: I think there's an overlap, so I have to be -- I  
6 mean, we're talking -- we're talking -- might want to make sure I'm not  
7 making any misrepresentations about Miles.

8 If you look in Miles, there is in column 2, it talks about what  
9 microcrystalline is; 0.1 microns. So if you do a back-of-the-envelope  
10 calculation, all right, 0.1 microns is 1,000 angstroms. So there's an  
11 overlap. Right? We're saying Johnson is less than 200 angstroms, we're  
12 more than 200 angstroms. Okay? So there's an overlap there.

13 But my point is still, if Langer is saying you don't go there, and  
14 Miles covers maybe an overlap including some fine grain and a lot of  
15 coarse grain, you can't combine Miles with Langer because it's saying not  
16 to go there.

17 Because if I read Langer, why would I read Miles and say, Oh,  
18 wow, this thing with greater -- larger coarse crystals, let's put that in a  
19 mounting mat. And Langer is telling me not to do that.

20 JUDGE KRATZ: And Miles doesn't say anything about a  
21 mounting mat?

22 MR. SIDOTI: Not at all.

1 JUDGE KRATZ: So that's the point you're trying to make in  
2 total. You're saying Miles is not giving you any information that goes to  
3 modify Robinson; you have to have Langer present to get that --

4 MR. SIDOTI: That's --

5 JUDGE KRATZ: -- modification.

6 MR. SIDOTI: -- that's correct. And Langer, if I would read  
7 Langer, there's no way I would  
8 run to coarse. I would run the opposite. I would run -- in fact, I would  
9 run towards substantially amorphous, because he's saying that that's even  
10 better because it's a cost savings and an energy savings.

11 JUDGE KRATZ: I understand your position.

12 MR. SIDOTI: So I really don't have any other --

13 JUDGE SCHAFER: Okay. Yeah. Well, that's good, because  
14 your time is up.

15 MR. SIDOTI: I didn't even get to the dependent claim.

16 JUDGE SCHAFER: That's all right. It's in your brief. We do  
17 consider your brief.

18 MR. SIDOTI: Well, I do appreciate that. I appreciate you  
19 having me today.

20 JUDGE SCHAFER: Okay. Thank you. The case is submitted.

21 MR. SIDOTI: Thank you, your Honors.

22 **(The hearing was concluded at 2:45 p.m.)**

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